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(54) Abstract Title
Control of washer pump to provide intermittent jets of water

(57) Apparatus for controlling a washer pump of a vehicle comprising means for receiving a signal indicating a request for water and switching means for switching the pump on and off intermittently in response to the signal. Preferably the apparatus is programmable and the switching means interrupts the electrical supply to the pump. The apparatus may be an integral unit which can be fitted between a switch and a wash pump in any vehicle. Preferably the first switching means is arranged such that the pump is on longer for the first time during a request than at any other time and the periods for which the pump is off are longer than those for which it is on. The switching means may be arranged to coordinate with the movement of a windscreen wiper.

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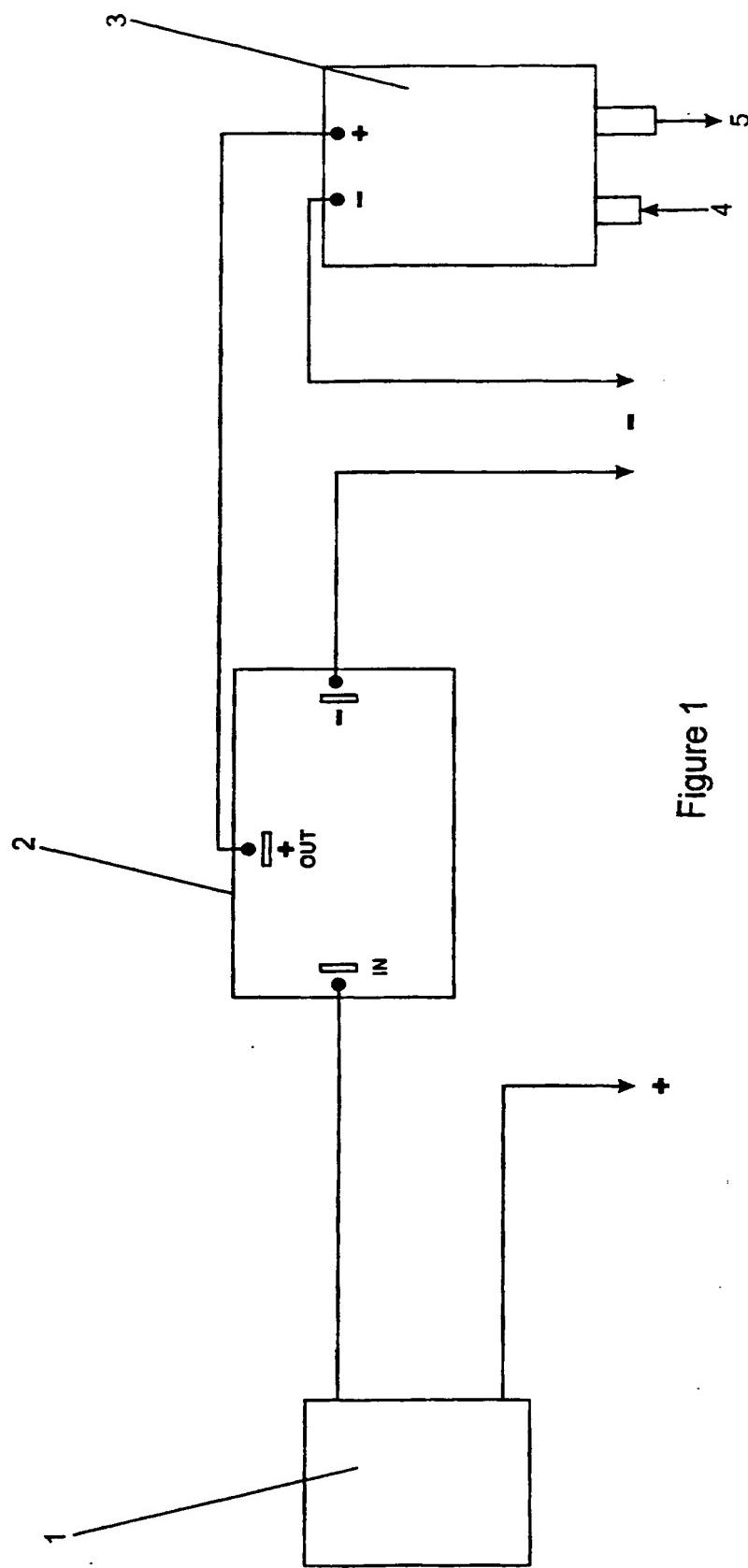


Figure 1

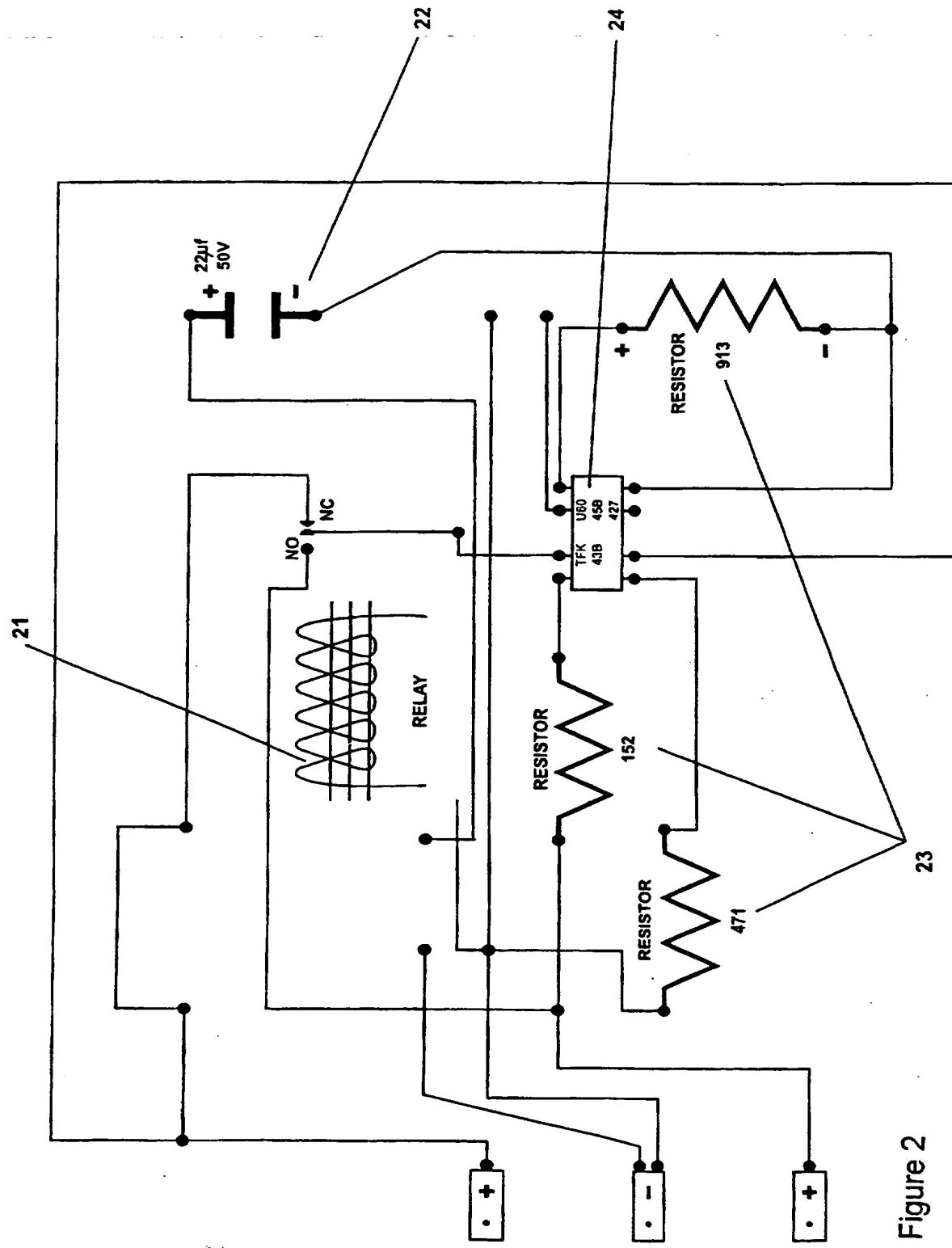


Figure 2

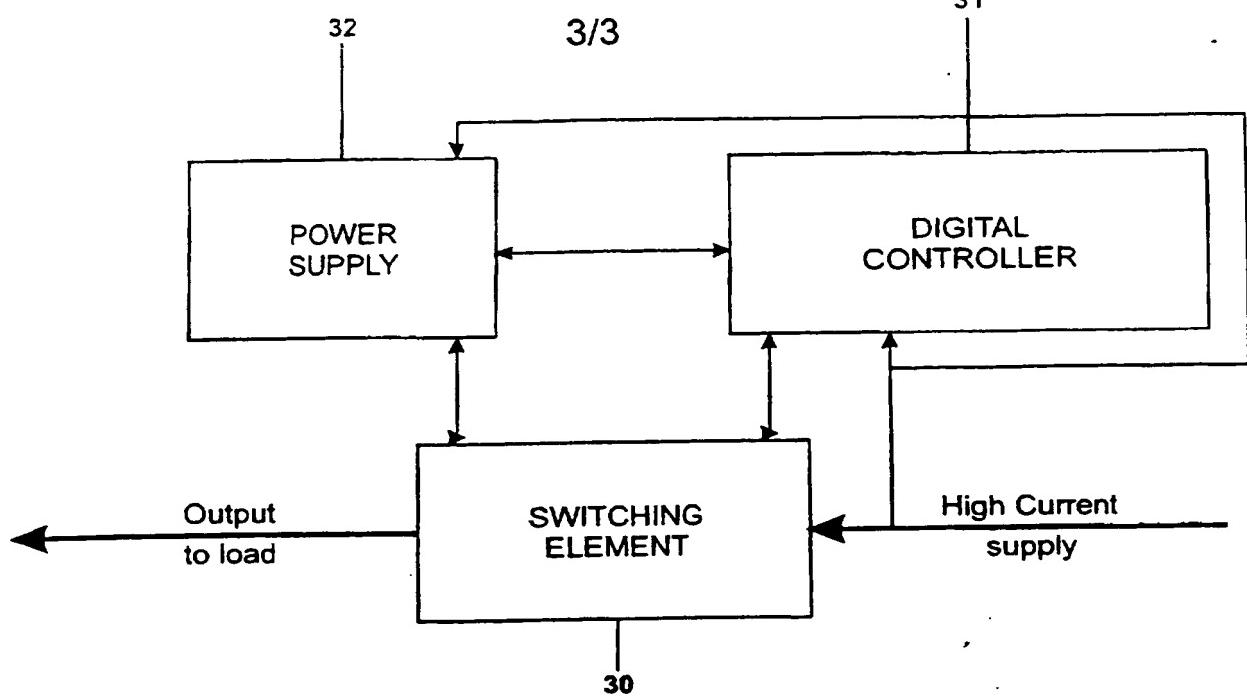


FIGURE 3a

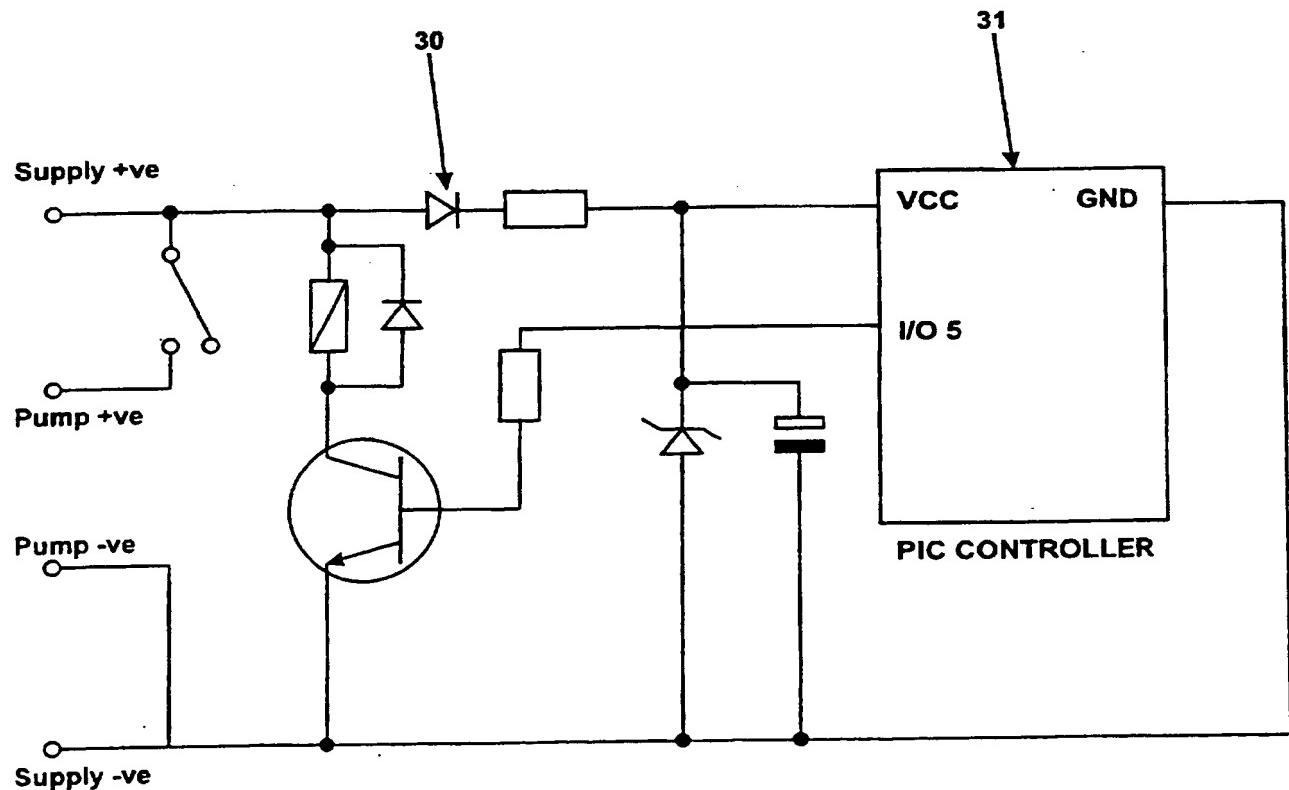


FIGURE 3b

WINDSCREEN WASHER PUMP CONTROL

This invention relates to windscreen and headlamp washers for vehicles and, in particular, to an apparatus 5 for controlling a wash pump.

Conventional windscreen washers pump a continuous jet of washing fluid onto a screen through nozzles positioned on the body of a vehicle. Windscreen wipers usually operate to clean the screen in conjunction with the washer 10 fluid, although headlamps are often cleaned just by jets of washer fluid.

On long journeys large amounts of washer fluid may be required and thus needed to be stored in vehicles. As minimisation of vehicle weight has become increasingly 15 important to manufacturers of fuel efficient and high performance cars and other vehicles, a compromise between frequent topping up of small washer fluid tanks or increased vehicle weight has had to be struck. Various washer systems exist which operate mechanically to provide 20 washer water cyclically, and such as the system disclosed in GB-B-2206483. An object of the present invention is to enable efficient use of a given volume of washer fluid even in vehicles fitted with conventional continuous supply washer fluid systems.

According to the present invention there is provided 25 an apparatus for controlling a washer pump of a vehicle, the apparatus comprising:

an input means for receiving a signal indicating a request for washer water; and

switching means for periodically switching a screen 30 washer pump on and off to drive the pump intermittently in response to the request signal.

Washer fluid is therefore supplied in intermittent pulses with the result that washer fluid is utilised more 35 efficiently. It has been found that the invention provides improved cleaning over systems utilising continuous washer fluid jets. Also, the invention provides apparatus which

is reliable and may be straightforwardly fitted to existing vehicles having conventional continuous supply systems. Furthermore, the lifetime of washer fluid pumps is extended as they are used for a shorter time for a given amount of windscreen cleaning.

5 The switching means may be programmable.

Preferably, the signal is the electrical supply to the washer pump and the switching means turns the screen washer pump on and off by interrupting the electrical supply. The apparatus may then comprise an integral unit which may be connected between a request switch and a screen wash pump of a vehicle.

10 It is preferable that the first length of time for which the pump is on during a request is longer than the subsequent lengths of time for which it is on or off.

15 It is also preferable that the time periods for which the pump is on, other than the first period, are shorter than those for which the pump is off.

20 The switching may be suitably co-ordinated with the movement of a windscreen wiper. The switching may also be varied according to user requirements such that the time periods for which the pump is on or off are varied.

25 An example of the present invention will now be described with reference to the accompanying drawings, in which:

Figure 1 is a diagram illustrating a washer pump system;

Figure 2 is a diagram illustrating a control unit for a washer pump system; and

30 Figures 3A and 3B are diagrams illustrating a second example of the invention.

Referring to Figure 1, a switch 1, often mounted on the steering column of a vehicle, is used to provide a request signal for directing washing fluid to a vehicle windscreen or headlamps. The driver may alternatively push a button to request washer fluid or the windscreen wipers and the washing fluid supply may be operated together.

Alternatively, mechanisms have been suggested for operating windscreen wipers and/or washer fluid supplies in response to dirt or moisture on a windscreen.

A control unit 2 receives the request signal and a circuit within the control unit is initiated. The circuit comprises (see fig. 2) a capacitor 22 and a relay 21. When a request signal is received current flows to charge the capacitor 22. Thus, power is supplied to the relay 21 and in turn to a washer pump 3. When the capacitor 22 becomes fully charged the current ceases and the pump 3 is turned off. The microchip 24 acts to vary the time period between turning the pump on or off. Thus, the power supply to the washer pump 3 is turned on and off intermittently.

When the washer pump 3 is turned on, washing fluid is pumped from a tank (not shown) through an inlet 4 and out through an outlet 5 to nozzles (not shown) disposed on a vehicle body. The nozzles may be positioned in front of a windscreen, rear windscreen or headlamps, for example. As the washer pump 3 is turned on and off pulses of washer fluid are emitted through the nozzles.

In this example, the washer pump is turned on for a time period T and then off for a time period longer than T. This is then repeated for as long as a request signal is received by the control unit 2, ie. as long as the washer switch 1 is operated. Thus, pulses of washing fluid are emitted from the nozzles having duration T and spaced apart by a period longer than T.

To ensure that sufficient washing fluid is pumped to the screen to begin the washing, the first period for which the pump 3 is on is extended to a period longer than T.

Figures 3A and 3B show a second example of the present invention, in which components corresponding to those in the example of figure 2 are numbered identically. In this example, the control unit 2, which controls the power supply to the pump 3 has three core components, a switching element 30, a digital controller 31, and a power supply 32. The power supply 32 draws electrical power from the current

being supplied to the pump 3 and powers the switching element 30 and digital controller 31. The digital controller 31 controls the switching element 30 in accordance with a program that may be either pre-stored or
5 loaded during use.

Figure 3B shows in more detail the component required for the switching element 30 and their connection to a digital controller. In use, all of these components may be encased in a single unit to improve ease of installation
10 and to ensure adequate mechanical protection.

The digital controller 31 may control the timing of the switching element based on information provided to it by a water level sensor and/or by a wiper position detector to ensure optimum control dependent upon the level of water
15 remaining in a water supply and wiper position during use.

It can be appreciated that control unit 2 is integral. By selecting suitable components 21 and 22, along with suitable resistors 23, the unit is designed to be compatible with washing systems in existing vehicles.
20 Installation in existing washing systems is achieved by connecting the unit 2 between a switch 1 for requesting washing fluid and a washer pump 3. Thus, without anything further, existing continuous jet washing systems are altered to provide intermittent washing fluid jets. It
25 can, of course, be appreciated that the unit can also be incorporated into new vehicles during manufacture.

CLAIMS

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1. An apparatus for controlling a washer pump of a vehicle, the apparatus comprising:

an input means for receiving a signal indicating a request for washer water; and

10 switching means for periodically switching a screen washer pump on and off to drive the pump intermittently in response to the request signal.

15 2. An apparatus according to claim 1, wherein the switching means is programmable.

20 3. An apparatus according to claim 1 or claim 2, wherein the signal is the electrical supply to the washer pump and the switching means turns the screen washer pump on and off by interrupting the electrical supply.

4. An apparatus according to any preceding claim, comprising an integral unit connected between a request switch and a screen wash pump of a vehicle.

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5. An apparatus according to any claim 4, wherein the switching means is configured such that the first length of time for which the pump is on during a request is longer than the subsequent lengths of time for which it is on or

30 off.

6. An apparatus according to claim 5, wherein the time periods for which the pump is on, other than the first period, are shorter than those for which the pump is off.

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7. An apparatus according to any preceding claim, wherein the switching means is configured to co-ordinate with the movement of a windscreen wiper.

5 8. An apparatus according to any preceding claim, wherein the switching means is configured to vary switching according to user requirements such that the time periods for which the pump is on or off are varied.



Application No: GB 9906972.6
Claims searched: 1-8

Examiner: Ceri Witchard
Date of search: 19 July 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q): A4F (FAMB FAA FAL FBA)

Int Cl (Ed.6): B60S (1/46 1/48)

Other: Online: wpi epodoc japiro

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2206036 A (JAGUAR CARS) See especially page 3 lines 10-22	1, 3, 7
X	US 4285089 (NISSAN MOTOR) See column 5 lines 3-64	1, 3, 7
X	US 3799704 (GENERAL MOTORS) See column 3 lines 3-13 and 38-53 and column 6 lines 13-28	1-4, 7
X	WPI Abstract Accession No.82-E4315E & DE 3123729 (BMW) 15.04.1982 See abstract	1 at least

- Document indicating lack of novelty or inventive step
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